

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE  
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:-  
/WHAT I/WE CLAIM AS MY/OUR INVENTION:-**

1. A method of reducing carbon levels in fly ash comprising:
  - (a) placing the fly ash in a microwave reactor;
  - (b) exposing the fly ash to microwave radiation in the presence of carbon-free material so as to raise the fly ash temperature to at least 600°C while agitating the fly ash in the presence of oxygen; and
  - (c) terminating exposure of said fly ash to said microwave radiation when the carbon content of the fly ash has fallen below a predetermined level.
2. The method of claim 1 wherein the microwave reactor is a fluidized bed vessel.
3. The method of claim 1 further including a system for monitoring the temperature of said fly ash.
4. The method of claim 1 carried out without the addition of auxiliary fuel.
5. The method of claim 1 wherein the fly ash has a carbon content of

at least 3% by weight.

6. The method of claim 1 wherein the microwave radiation has a frequency between 300 MHz and 3000 MHz.
7. The method of claim 1 wherein a microwave radiation power level and process duration time are employed which are sufficient to produce a specific energy in the fly ash of between 2 kW-h/t and 25 kW-h/t.
8. The method of claim 1 wherein a microwave radiation power level and process duration time are employed which are sufficient to produce a specific energy in the fly ash of between 5 kW-h/t and 10 kW-h/t.
9. The method of claim 1 wherein the fly ash has a size in excess of 106 microns.
10. The method of claim 1 wherein the exposure of said fly ash to said microwave radiation is terminated when the temperature of the fly ash falls below 600°C.
11. The method claim 1 wherein the predetermined level is 3% carbon by weight.

12. The method of claim 1 wherein the microwave reactor further includes a material feed system to introduce fresh fly ash and a removal system to remove treated fly ash.
13. The method of claim 12 wherein the material feed system is adapted to introduce fresh fly ash into the microwave reactor when the carbon content of the treated fly ash falls below a predetermined level.
14. The method of claim 1 wherein the microwave reactor further includes a material feed system to continuously introduce fresh fly ash and a removal system to continuously remove treated fly ash, in which the fly ash within the microwave reactor is maintained at a temperature in the range 800°C-850°C and specific microwave energy in the range 5-10 kW-h/t is imparted to it.
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15. A method of reducing carbon levels and ammonia levels in fly ash containing ammonia comprising:
- (a) exposing the fly ash to microwave radiation in the presence of carbon-free material so as to raise its temperature to at least 600°C while agitating the fly ash in the presence of oxygen; and
  - (b) terminating exposure of said fly ash to said microwave

radiation when the carbon content of the fly ash has fallen below a predetermined level.

16. The method of claim 16 wherein the microwave reactor is fluidized bed vessel.
17. The method of claim 16 further including a system for monitoring the temperature of said fly ash.
18. The method of claim 16 carried out without the addition of auxiliary fuel.

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